Data Storage

Binary Addition

Dr. M. Tanvir Afzal

Addition

Decimal

- ✓ 25 + 38

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Binary Addition

$$
\begin{array}{r} 0 \\ +0 \\ \hline 0 \end{array}
\qquad
\begin{array}{r} 1 \\ +0 \\ \hline 1 \end{array}
\qquad
\begin{array}{r} 0 \\ +1 \\ \hline 1 \end{array}
\qquad
\begin{array}{r} 1 \\ +1 \\ \hline 10 \end{array}
$$

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Examples

$$\begin{array}{r} 0 \\ +0 \\ \hline 0 \end{array} \qquad \begin{array}{r} 1 \\ +0 \\ \hline 1 \end{array} \qquad \begin{array}{r} 0 \\ +1 \\ \hline 1 \end{array} \qquad \begin{array}{r} 1 \\ +1 \\ \hline 10 \end{array}$$

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
128	64	32	16	8	4	2	1	
0	0	0	1	0	0	0	1	17
0	0	0	0	0	0	1	1	03
0	0	0	1	0	1	0	0	20

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Examples

$$
\begin{array}{r} 0 \\ +0 \\ \hline 0 \end{array}
\qquad
\begin{array}{r} 1 \\ +0 \\ \hline 1 \end{array}
\qquad
\begin{array}{r} 0 \\ +1 \\ \hline 1 \end{array}
\qquad
\begin{array}{r} 1 \\ +1 \\ \hline 10 \end{array}
$$

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
128	**64**	**32**	**16**	**8**	**4**	**2**	**1**	
0	0	0	0	1	1	1	1	15
0	0	0	0	1	1	1	1	15
0	0	0	1	1	1	1	0	30

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Examples

$$\begin{array}{r} 0 \\ +0 \\ \hline 0 \end{array} \qquad \begin{array}{r} 1 \\ +0 \\ \hline 1 \end{array} \qquad \begin{array}{r} 0 \\ +1 \\ \hline 1 \end{array} \qquad \begin{array}{r} 1 \\ +1 \\ \hline 10 \end{array}$$

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
128	**64**	**32**	**16**	**8**	**4**	**2**	**1**	64
0	1	0	0	0	0	0	0	64
0	1	0	0	0	0	0	0	128
1	0	0	0	0	0	0	0	

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Examples

```
  0        1        0        1
+0       +0       +1       +1
  0        1        1       10
```

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
128	**64**	**32**	**16**	**8**	**4**	**2**	**1**	
0	0	0	0	1	0	1	1	11
0	0	0	0	1	1	1	0	14
0	0	0	1	1	0	0	1	25

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Examples

$$\begin{array}{r} 0 \\ +0 \\ \hline 0 \end{array} \qquad \begin{array}{r} 1 \\ +0 \\ \hline 1 \end{array} \qquad \begin{array}{r} 0 \\ +1 \\ \hline 1 \end{array} \qquad \begin{array}{r} 1 \\ +1 \\ \hline 10 \end{array}$$

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2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
128	**64**	**32**	**16**	**8**	**4**	**2**	**1**	
0	0	1	1	1	0	1	0	58
0	0	0	1	1	0	1	1	27
0	1	0	1	0	1	0	1	85

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Summary

Binary Addition

- ✓ Rules
- ✓ Examples

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